Method for the Construction of Novel Photovoltaic Structures Closely Mimicking Key Elements of Natural Photosynthesis

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Introduction

Natural photosynthesis routinely converts visible light into energy at an efficiency approaching 100%. Natural photosynthesis is, therefore, the the gold standard to which artificial attempts at mimicking this process are compared.

Natural photosynthesis is capable of remarkable levels of efficiency as a result of complementary dynamics of electron clouds of atoms composing organic structures within chloroplasts triggering a phenomenon not presently acknowledged by the scientific community at large that may be termed hemisphere-local electron cloud anionization (ibid.) In this phenomenon, an asymmetry is created in individual electron clouds resulting in an asymmetrical distribution of electrons within electron clouds i.e. certain regions of electron clouds would be less likely, at any given moment in time, to feature an electron in any given part of that region in defiance of currently widespread beliefs about electron distributions within individual electron shells. It is puzzling that an asymmetry was not hypothesized sooner given that an asymmetry already exists between the count of electrons in various shells in most of the chemical elements. The result of this is that photons passing through these regions are more likely to transition into electrons despite the atoms having a net negative electrical charge. Region-specific zones of positive charge within electron clouds are what make efficient light-to-energy conversion possible.

Given this premise, we may begin to explore practical approaches to taking advantage of this unacknowledged phenomenon by modifying existing methods of light-to-energy conversion traditionally used in photovoltaics in order to increase efficiency.

Abstract

Photovoltaic molecules with specific geometric structures are the required starting point in such an endeavor, with mixtures of conical and linear molecules being ideal for this application.

A novel epitaxy technique may be utilized in order to bring about a condition in which hemispheric asymmetries may be created and maintained in these photovoltaic compounds' atoms' electron clouds in a solid-state photovoltaic mechanism.

Compound A, which would be conical in shape, would be deposited via epitaxy onto an optically-transparent substrate under high-heat conditions that maintain

the liquid state of the deposited molecules. In addition to the ingredient of heat, this epitaxy would be performed under conditions of extreme barometric pressure. Extreme pressure would reduce the volume of individual droplets whilst simultaneously increasing the melting point of the metals.

After the successful deposition of Compound A upon the substrate, Compound B and its linear molecules would be conveyed through epitaxy onto the substrate, occupying the empty spaces, as much as is possible, between the droplets of Compound A. A careful balance of heat and pressure would be utilized in order to allow state changes between liquid and solid to be "played like a fiddle," using barometric pressure to cause re-solidification of the droplets according to a particular rhythm and the release of pressure to cause the droplets to expand and to periodically come into contact with one another. These droplets would be roughly half-micron in scale.

In an expansion phase, pressure is reduced while heat is increased, causing droplets to remain liquid while expanding and producing a partial merger of droplets with the target overlap (resembling a Venn diagram.) Once this merger is completed to the desired degree, the droplets are made to solidify for a moment.

At this point, pressure is increased prior to reducing heat and the process is repeated several times in succession with less droplet expansion being brought about with each successive cycle. The consequence of this is that asymmetries in terms of the tendency of linear and conical molecules to expand and contract would result in mechanical force being generated between them at the time of final solidification.

This mechanical force mimics the mechanical force exerted by protein structures within organic chloroplasts. This force would bring about an asymmetry of electron distribution within electron clouds within both Compound A and Compound B.

The transparent substrates upon which these overlapping beads of photovoltaic compounds would be deposited would then be layered and inserted lengthwise into solar cells much as playing cards when put back into their box. The small diameter of the beads and their spatial arrangement would create many opportunities for light-to-energy conversion, few opportunities for light-to-heat conversion and a strong tendency toward efficiency thermal dissipation to the extent that light-to-heat conversion events do transpire, further improving function and extending unit life.

Conclusion

Not only would such a photovoltaic design be far more efficient, the manufacturing process is one that is easily scalable and comparatively low in cost versus current methods.